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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,714	12/08/2005	Yuji Segawa	450100-04734	5948

22852 7590 07/16/2008

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EXAMINER	
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ART UNIT	PAPER NUMBER
1634	
MAIL DATE	DELIVERY MODE
07/16/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,714	SEGAWA ET AL.	
	Examiner	Art Unit	
	NARAYAN K. BHAT	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-31* is/are pending in the application.

4a) Of the above claim(s) *22,23 and 31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-21 and 24-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/31/2007 & 6/24/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FINAL ACTION

1. This office action is written in reply to applicant's correspondence filed April 3, 2008. Claims 3, 4, 7-11, 13-15, 17-19, 21, 24, 26, 29 and 30 were amended and 1-2 were cancelled. Applicant's amendments requiring floating potential electrodes dispersed in a matrix lay out between the counter electrodes necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**.

2. Claims 3-31 are pending in this application.

3. Claims 3-21, 24-30 are under examination.

Amendments to Claims

4. Amendments to the claims 3, 4, 7-11, 13-15, 17-19, 21, 24, 26, 29 and 30 have been reviewed and entered.

Claim Interpretation

35 U.S.C. 112, sixth paragraph

5. Claim 3, from which claims 4-7 depend and claim 18 from which claims 19-21 depend are written using means-plus- function language to define the "means for migrating the stretched nucleotide probes toward a pair of adjacent electrodes of the scanning electrodes by dielectrophoresis" (claims 3-7) and "means for immobilizing the stretched nucleotide probes between the energized scanning electrode and second

scanning electrode" (claims 18-21). Therefore, the said claims are evaluated under 35 U.S.C. 112, Sixth Paragraph.

'The M PEP § 2181-2184 provides guidance for claim evaluation and examination under 35 U.S.C. 112, Sixth Paragraph as set forth below:

The USPTO must apply 35 U.S.C. 112, sixth paragraph in appropriate cases, and give claims their broadest reasonable interpretation, in light of and consistent with the written description of the invention in the application. See Donaldson, 16 F.3d at 1194, and 29 USPQ2d at 1850 (stating that 35 U.S.C. 112, sixth paragraph "merely sets a limit on how broadly the PTO may construe means-plus-function language under the rubric of reasonable interpretation". The Federal Circuit has held that applicants (and reexamination patentees) before the USPTO have the opportunity and the obligation to define their inventions precisely during proceedings before the PTO. See In re Morris, 127 F.3d 1048, 1056-57, 44 USPQ2d 1023, 1029-30 (Fed. Cir. 1997).

> A claim limitation will be presumed to invoke 35 U.S.C. 112, sixth paragraph, if it meets the following 3-prong analysis:
> (A) the claim limitations must use the phrase "means for" or "step for; "
> (B) the "means for" or "step for" must be modified by functional language; and
> (C) the phrase "means for" or "step for" must not be modified by sufficient structure, material, or acts for achieving the specified function. (see MPEP § 2181(I)).

6. In the instant case the "means" as recited in claim 3 does not meet the third criteria of the 3-prog analysis, viz., the claim language is modified by sufficient structure for achieving the function, i.e., means for migrating stretched nucleotide probes toward a pair of adjacent electrodes of the scanning electrodes are bridged by nucleotide probes immobilized between the adjacent electrodes by dielectrophoresis.

7. The "means" as recited in claim 18 meet the three-prong test and therefore will

be interpreted in light of the "means" disclosed in the specification. The instant specification defines the means as AC electric filed (see instant specification, USPGPUB NO. paragraph 0014, instant claim 21).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 24-28 and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Zenhausern et al (USPGPUB NO. US 2004/0011650 filed Jul. 22, 2002).

Regarding claim 24, Zenhausern et al teaches a device that includes a reaction region (Fig. 2, # 400), counter electrodes (Fig. 3, # 510, # 512), floating potential electrodes in regular intervals (Fig. 3, # 501, # 502, # 503, # 504 and # 505).

Zenhausern et al teaches a device that includes a channel (i.e., a reaction region) for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes (Fig. 2, # 400, paragraphs 0014 and 0252). Zenhausern et al further teaches filed generating outer electrodes (i.e., counter electrodes) are disposed in the reaction region (Fig. 3, # 510, # 512, paragraph 0254) and explicitly teaches floating electrodes i.e., floating-potential

electrodes being dispersed between the counter electrodes in a regular interval (Fig. 3, #s 501-505, paragraph 0254, Fig. 4, dielectrophoretic electrode # 530, Floating electrode # 531). Instant specification defines "matrix layout as an interval" (Instant specification USPGPUB, paragraph 0173). Therefore interval teachings of Zenhausern et al meets the limitation of matrix lay out as claimed.

Regarding claim 25, Zenhausern et al teaches that the floating-potential electrodes have a shape being capable of generating a non-uniform electric field (Fig. 4, # 531, paragraphs 0014, 0059 and 0252).

Regarding claim 26, Zenhausern et al teaches that the field generating electrodes, i.e., counter electrodes have dimensions in millimeters (paragraph 0055) and floating electrodes have dimensions in micrometers (paragraph 0254) thus teaching each surface of the floating-potential electrodes is smaller than that of the counter electrodes.

Regarding claim 27, Zenhausern et al teaches that the surfaces of the floating-potential electrodes are treated for immobilizing the nucleotides probes (paragraph 0254).

Regarding claim 28, Zenhausern et al teaches that the field generating electrodes, i.e., counter electrodes are aligned in parallel with each other (Fig. 2, #s 420 and 421, paragraph 0252).

Regarding claim 30, Zenhausern et al teaches a device that include field generating electrodes and floating electrodes and a channel (Fig. 3, paragraph 0254)

for manipulating analytes via dielectrophoresis and detecting target analytes (paragraph 0014) thus teaching a sensor chip comprising the hybridization detector.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 3-21, 24 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zenhausern et al (USPGPUB NO. US 2004/0011650 filed Jul. 22, 2002) in view of Sato et al (USPN 6,582,954 issued June 23, 2003) and further in view of Eichen et al (USPGPUBNO. 2003/0203394 filed May 4, 1999).

Regarding claim 3, Zenhausern et al teaches a device that includes a reaction region (Fig. 2, # 400), counter electrodes (Fig. 2, # 420 and 421), scanning electrodes (Fig. 2, # 430) and a power source (paragraph 0014).

Zenhausern et al teaches a channel, (i.e., a reaction region) for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes (Fig. 2, # 400, paragraphs 0014 and 0252).

Zenhausern et al teaches field generating electrodes (i.e., counter electrodes) for generating an electric field (Fig. 2, # 420 and 421, paragraphs 0014 and 0252) and further teaches a plurality of floating electrodes (i.e., scanning electrodes) arrayed in the reaction region comprising capture probes (Fig. 2, # 430, paragraphs 0014 and 0252). Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0014-0015, 0024-0026, 0052-0059 and 0252-0254). Zenhausern et al teaches dielectrophoresis means for migrating nucleic acids towards adjacent electrodes by a non-uniform electric filed (paragraphs 0024-0025).

Regarding claim 4, Zenhausern et al teaches a device wherein floating potential electrodes (i.e., scanning electrodes) are immobilized with the probes and manipulating nucleic acids via dielectrophoresis and detecting target analytes (paragraphs 0014 and 0024-0025). Adjacent electrodes of the scanning electrodes are interpreted broadly as part of a plurality of scanning electrodes taught by Zenhausern et al.

Zenhausern et al are silent about target nucleotide sequences hybridized with the nucleotide probes immobilized between the adjacent electrodes.

Regarding claim 5, Zenhausern et al teaches that the floating electrodes, i.e., scanning electrodes have polygonal ends (paragraphs 0055 and 0252).

Regarding claim 6, Zenhausern et al teaches that the field generating electrodes, (i.e., counter electrodes) are disposed so as to oppose each other and be in parallel with each other (Fig. 2, counter electrodes #s 420 and 421, paragraph 0252).

Regarding claim 7, Zenhausern et al teaches an alternating current, but silent about generating an alternating current field (paragraph 0246).

Regarding claim 8, Zenhausern et al teaches a device that includes a reaction region (Fig. 2, # 400), a common electrode (Fig. 2, # 420 and 421), scanning electrodes (Fig. 2, # 430) and power source (paragraph 0014).

Zenhausern et al teaches a device that includes a channel (i.e., a reaction region) for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes (Fig. 2, # 400, paragraphs 0014 and 0252).

Zenhausern et al also teaches a field generating electrode, i.e., a common electrode disposed in the reaction region (Fig. 3, # 510, paragraph 0254) and further teaches floating electrodes (i.e., scanning electrodes) aligned in parallel (Fig. 3, See the parallel arrangement of scanning electrodes # 501 and # 505; # 502 and # 504, paragraph 0254).

Zenhausern et al also teaches a power source (i.e., an electric filed generator, paragraphs 0014, 0270) and an AC voltage (paragraph 0254) for its intended use for energizing the common electrodes by sequentially applying a voltage between the

common electrode and the energized scanning electrode to generate an electric filed in the reaction region. Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0014-0015, 0024-0026, 0052-0059 and 0252-0254). Zenhausern et al also teaches applying electric filed sequentially to a plurality of electrodes to control the movement of sample components (paragraph 0117) thus encompassing an electric filed generator energizing the common electrode and scanning electrode by sequentially applying a voltage between the common electrode and the energized second electrode to generate an electric filed in the reaction region.

Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0014-0015, 0024-0026, 0052-0059 and 0252-0254). Zenhausern et al teaches dielectrophoresis means for migrating nucleic acids towards energized scanning electrode in response to a the electric filed (paragraphs 0024-0025).

Zenhausern et al are silent about bridging the energized scanning electrode and the second scanning electrode by nucleotide probes immobilized between them.

Regarding claim 9, Zenhausern et al teaches a field generating electrode, i.e., a common electrode (Fig. 3, #510) and the floating electrodes (i.e., scanning electrodes; Fig. 3, # 501). Zenhausern et al also teaches that the scanning electrodes are aligned in two lines and an end of the scanning electrodes in one line opposes an end of the scanning electrodes in the other line (Fig. 4, See the alignment of electrodes 530 and 531, paragraph 0254).

Regarding claim 10, Zenhausern et al teaches a plurality of scanning electrodes are disposed so that the distances between the opposing scanning electrodes increase stepwise in the direction that a voltage is sequentially applied (paragraphs 0117 and 0254).

Regarding claim 11, Zenhausern et al teaches a device wherein scanning electrodes comprise probes and further teaches the manipulation of analytes via dielectrophoresis and detecting target analytes (paragraphs 0014-0015 and 0024-0026) but is silent about target nucleotide sequences in a stretched form are hybridized with the nucleotide probes immobilized between the energized scanning electrode and the second scanning electrode.

Regarding claim 12, Zenhausern et al teaches that the floating electrodes, i.e., scanning electrodes have polygonal ends (paragraphs 0055 and 0252).

Regarding claim 13, Zenhausern et al teaches an alternating current, but silent about generating an alternating current field (paragraph 0246).

Regarding claim 14, Zenhausern et al teaches a device that includes a reaction region (Fig. 2, # 400), a plurality of scanning electrodes (Fig. 2, # 430, paragraph 0014) and power source (paragraph 0014).

Zenhausern et al teaches a device that includes a channel (Fig. 2, # 400, paragraphs 0014 and 0252), i.e., a reaction region for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes. Zenhausern et al also teaches a plurality of floating electrodes (Fig. 3, #s 501-505, and paragraph 0254), i.e., first scanning electrodes arrayed in the

reaction region; second scanning electrodes arrayed so that the ends of the second scanning electrodes oppose the respective ends of the first scanning electrodes (Fig. 4, #s 530 and 531, paragraph 0254 and 272). Zenhausern et al also teaches a power source (i.e., an electric filed generator, paragraphs 0014, 0270) and an AC voltage (paragraph 0254) for its intended use for energizing the common electrodes by sequentially applying a voltage between the common electrode and the energized scanning electrode to generate an electric filed in the reaction region. Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0014-0015, 0024-0026, 0052-0059 and 0252-0254).

Zenhausern et al teaches dielectrophoresis means for migrating nucleic acids towards energized scanning electrode in response to a the electric filed (paragraphs 0024-0025). Zenhausern et al are silent about first and second groups of nucleotide probes and bridging of the adjacent electrodes to the first scanning electrodes by the first group of the nucleotide probes and bridging of the adjacent electrodes to the second scanning electrodes by the second group of the nucleotide probes.

Regarding claim 15, Zenhausern et al a device wherein scanning electrodes comprise probes and further teaches the manipulation of analytes via dielectrophoresis and detecting target analytes (paragraphs 0014-0015 and 0024-0026) but is silent about target nucleotide sequences are hybridized with the first and send group of nucleotide probes respectively immobilized between the first and second scanning electrodes.

Regarding claim 16, Zenhausern et al teaches that the floating electrodes, i.e., scanning electrodes have polygonal ends (paragraphs 0055 and 0252).

Regarding claim 17, Zenhausern et al teaches an alternating current, but silent about generating an alternating current field (paragraph 0246).

Regarding claim 18, Zenhausern et al teaches a device that includes a reaction region (Fig. 2, # 400), a common electrode (Fig. 2, # 420 and 421), scanning electrodes (Fig. 2, # 430) and power source (paragraph 0014).

Zenhausern et al teaches a device that includes a channel (i.e., a reaction region) for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes (Fig. 2, # 400, paragraphs 0014 and 0252). Zenhausern et al further teaches a field generating electrode (i.e., a common electrode) disposed in the reaction region (Fig. 3, # 510) and a plurality of floating electrodes (i.e., scanning electrodes) arrayed in the reaction region so that the ends of the scanning electrodes oppose the common electrode (Fig. 3, #s 501-505, paragraph 0254).

Zenhausern et al also teaches a power source (i.e., an electric filed generator, paragraphs 0014, 0270) and an AC voltage (paragraph 0254) for its intended use for energizing the common electrodes by applying a voltage between the common electrode and one of the scanning electrode to generate an electric filed in the reaction region. Zenhausern et al further teaches a power source for generating asymmetrical, oscillating electric field to manipulate analytes by dielectrophoresis (Figs. 3 and 4, paragraphs 0014-0015, 0024-0026, 0052-0059 and 0252-0254). Zenhausern et al also

teaches that voltage is applied to the floating electrode, i.e., scanning electrode (paragraph 0254), which is defined in the instant specification as energizing the scanning electrode (instant specification, paragraph 0014).

Zenhausern et al teaches dielectrophoresis means for migrating nucleic acids towards energized scanning electrode in response to a the electric filed (paragraphs 0024-0025). Zenhausern et al are silent about stretching the nucleotide probes and bridging of the energized electrode and the second scanning electrodes by the stretched nucleotide probes.

Regarding claim 19, Zenhausern et al a device wherein scanning electrodes comprise probes and further teaches the manipulation of analytes via dielectrophoresis and detecting target analytes (paragraphs 0014-0015 and 0024-0026) but silent about stretched target nucleotide sequences are hybridized with the probes immobilized between the first and second scanning electrodes.

Regarding claim 20, Zenhausern et al teaches that the floating electrodes, i.e., scanning electrodes have polygonal ends (paragraphs 0055 and 0252).

Regarding claim 21, Zenhausern et al teaches an alternating current, but silent about generating an alternating current field (paragraph 0246).

Regarding claim 24, Zenhausern et al teaches a device that includes a reaction region (Fig. 2, # 400), counter electrodes (Fig. 3, # 510, # 512), floating potential electrodes in regular intervals (Fig. 3, # 501, # 502, # 503, # 504 and # 505).

Zenhausern et al teaches a device that includes a channel (i.e., a reaction region) for hybridization between nucleotide probes and target nucleotide sequences

having a base sequence complementary to the nucleotide probes (Fig. 2, # 400, paragraphs 0014 and 0252). Zenhausern et al further teaches filed generating outer electrodes (i.e., counter electrodes) are disposed in the reaction region (Fig. 3, # 510, # 512, paragraph 0254) and explicitly teaches floating electrodes i.e., floating-potential electrodes being dispersed between the counter electrodes in a regular interval (Fig. 3, #s 501-505, paragraph 0254, Fig. 4, dielectrophoretic electrode # 530, Floating electrode # 531). Instant specification defines "matrix layout as an interval" (Instant specification USPGPUB, paragraph 0173). Therefore interval teachings of Zenhausern et al meets the limitation of matrix lay out as claimed.

Regarding claim 29, Zenhausern et al teaches an alternating current, but is silent about generating an alternating current field (paragraph 0246).

Regarding claim 3, Zenhausern et al are silent about stretching nucleotide probes and adjacent electrodes are bridged by nucleotide probes immobilized between the adjacent electrodes.

Regarding claim 8, Zenhausern et al are silent about bridging the energized scanning electrode and the second scanning electrode by nucleotide probes immobilized between them.

Regarding claim 14, Zenhausern et al are silent about first and second groups of nucleotide probes and bridging of the adjacent electrodes to the first scanning electrodes by the first group of the nucleotide probes and bridging of the adjacent

electrodes to the second scanning electrodes by the second group of the nucleotide probes.

Regarding claim 18, Zenhausern et al are silent about stretching the nucleotide probes and bridging of the energized electrode and the second scanning electrodes by the stretched nucleotide probes.

Regarding claims 7, 13, 17, 21 and 29, Zenhausern et al teaches an alternating current, but silent about generating an alternating current field (paragraph 0246).

Zenhausern teaches all the structural components of the sensor chip except for immobilizing different probes on the scanning electrodes, stretching of the nucleic acids by an electric field and bridging the electrodes by nucleic acids. Zenhausern et al are silent about an alternating current electric field.

However, immobilization of different probes on different electrodes and reaction region having a configuration for stretching nucleotide probes by an electric field was known in the art at the time of the invention was made as taught by Sato et al, who teaches explicitly a pair of opposing electrodes (Fig. 3, # 22 and 23) and different probes immobilized on different electrodes 22 (Fig. 3, Probes # 62 a and 62b, Electrodes # 22 and 23). Sato et al also teaches a reaction region (Fig. 4, # 24) and generation of electric filed between the electrodes by a power supply (Fig. 1, # 10) to extend the DNA probes and the sample DNA in the reaction region (Fig. 4c, probe # 66, sample nucleic acid # 63, columns 5 and 6, lines 44-67 and 1-40), thus providing a configuration for stretching the nucleotide probes and nucleic acid sample by an electric filed and immobilizing the probes in a stretched form. Sato et al further teaches

determining the base length, concentration, rate of hybridization and the amount of hybridization between a target and probe in a sample at a time (Figs. 5 and 7, columns 6-8).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have modified the reaction region configuration of Zenhausern et al to include the reaction region configuration of Sato et al with a reasonable expectation of success.

An artisan would have been motivated to modify the reaction region configuration of Zenhausern et al to include the reaction region configuration of Sato et al with the expected benefit of determining the base length, concentration, rate of hybridization and the amount of hybridization between a target and probe in a sample, all at one time as taught by Sato et al (Figs. 5 and 7, columns 6-8) thus acquiring more information about the sample with the device of Zenhausern et al.

Regarding claims 7, 13, 17, 21 and 29, Zenhausern et al teaches the AC current (paragraphs 0212 and 0246) but silent about generating electric field by alternating current. However the electric field generation by alternating current was known at the time of the invention made as taught by Sato et al, who teaches AC power supply (Fig. 1, # 12) and computer (Fig. 1, # 50) a means for generating electric field by alternate current. Sato et al further teaches that electric field generated by alternate current provides a means for attaching and detaching nucleic acids on the electrode and manipulating nucleic acids in the reaction region (Figs. 3a and b, column 5, lines 4-20).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have modified the electric field generation of Zenhausern et al to include the electric field generation by alternated current of Sato et al with a reasonable expectation of success.

An artisan would have been motivated to modify the electric field generation of Zenhausern et al to include the electric field generation by alternated current of Sato et al with the expected benefit of attaching and detaching nucleic acids on the electrode and manipulating nucleic acids in the reaction region as taught by Sato et al (Figs. 3a and b, column 5, lines 4-20).

Zenhausern et al and Sato et al are silent about bridging the electrodes by nucleic acids. However bridging the electrodes by nucleic acids was known in the art at the time of the claimed invention was made as taught by Eichen et al, who teaches a device comprising electrodes (Fig. 1A, electrodes, # 104 and # 106) immobilized with different nucleotide probes (Fig. 1A, probes # 110 and # 112) and forms a conductive bridge with sample comprising nucleic acids (Fig. 1A, sample # 114, paragraphs 0044-0045, 0134-0135). Eichen et al also teaches having different recognition elements on different electrodes is of great advantage to carry out quantitative measurements of the target sample's target quantity, increases the signal-to-noise ratio, and considerably decreasing the amount of false positive results (Example 28, paragraph 0297).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to modified the electrode of Zenhausern et al and Sato et

al and include the bridging capability of electrodes of Eichen et al Sato et al with a reasonable expectation of success.

An artisan would have been motivated to modify the electrode of Zenhausern et al and Sato et al and include the bridging capability of electrodes of Eichen et al with the expected benefit of having different probe elements on different electrodes, which is of great advantage to carry out quantitative measurements of the target sample's target quantity, increasing the signal-to-noise ratio and considerably decreasing the amount of false positive results as taught by Eichen et al (Example 28, paragraph 0297).

Double Patenting

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claims 3-7 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 of copending Application No. 11/221,940 in view of Sato et al and further in view of Eichen et al (USPGPUBNO. 2003/0203394 filed May 4, 1999). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons.

Regarding instant claim 3, claims 1-12, of the '940 copending application are drawn to a hybridization detecting unit comprising a reaction region (claim 1), a plurality of electrodes (claims 1, 4 and 6), an electric filed generator to induce dielectrophoresis (claim 8) a plurality of opposing electrodes with different immobilized probe (claim 9) to detect the target nucleic acid by moving target nucleic acid sequentially by dielectrophoresis (claim 1). The claims of 940 copending application are not drawn to a configuration for stretching nucleotide probes by an electric field. However, reaction region having a configuration for stretching nucleotide probes by an electric field was known in the art at the time of the invention was made as taught by Sato et al, who teaches explicitly a pair of opposing electrodes (Fig. 4, # 22 and 23) and probes immobilized on the electrode 22 (Fig. 4, # 66) and a solution reservoir region 24 (Fig. 4, # 24), i.e., reaction region, and by generating electric filed between the electrodes by a power supply (Fig. 1, # 10) to extend the DNA probes and the sample DNA in the reaction region (Fig. 4c, columns 5 and 6, lines 44-67 and 1-40), thus providing a configuration for stretching the nucleotide probes by an electric filed and immobilizing the probes in a stretched form. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the reaction region

configuration of stretching nucleotide probes by an electric field to include the reaction region configuration of Sato et al with the expected benefit of determining the base length, concentration, rate of hybridization and the amount of hybridization between a target and probe in a sample at a time as taught by Sato et al (Figs. 5 and 7, columns 6-8). As described in this office action in section 12 in detail, Eichen et al teaches the bridging of electrodes by nucleic acids.

It is also noted that Sato et al and Eichen et al further discloses additional limitations required by instant dependent claims 4-7 as described in detail in this office action in section 12. Therefore the embodiments of claims 4-7 are also obvious for the same reasons given above for instant claim 3. Dependent claims 4-7 are obvious over claims 1-12 of the '940 copending application in view of Sato et al and Eichen et al. Claims 4-7 of the instant application are obvious over claims 2-12 of the '940 copending application in view of Sato et al and Eichen et al.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

15. Claims 3-7 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-11 of copending Application No. 11/145,977 in view of Sato et al and further in view of Eichen et al (USPGPUBNO. 2003/0203394 filed May 4, 1999). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons.

Regarding instant claim 3, the claim 1 and of the '977 copending application are drawn to a hybridization detecting unit comprising a reaction region (claim 1), opposed electrodes disposed so that electric field can be applied to the medium in the reaction region and power supply (claim 1) to move the nucleic acids to the electrode and a probe on the electrode (claim 2). The claims of '977 copending application are not drawn to a configuration for stretching nucleotide probes by an electric field. However, reaction region having a configuration for stretching nucleotide probes by an electric field was known in the art at the time of the invention was made as taught by Sato et al, who teaches explicitly a pair of opposing electrodes (Fig. 4, # 22 and 23) and probes immobilized on the electrode 22 (Fig. 4, # 66) and a solution reservoir region 24 (Fig. 4, # 24), i.e., reaction region, and by generating electric filed between the electrodes by a power supply (Fig. 1, # 10) to extend the DNA probes and the sample DNA in the reaction region (Fig. 4c, columns 5 and 6, lines 44-67 and 1-40), thus providing a configuration for stretching the nucleotide probes by an electric filed and immobilizing the probes in a stretched form. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the reaction region configuration of stretching nucleotide probes by an electric field to include the reaction region configuration of Sato et al with the expected benefit of determining the base length, concentration, rate of hybridization and the amount of hybridization between a target and probe in a sample at a time as taught by Sato et al (Figs. 5 and 7, columns 6-8). As described in this office action in section 12 in detail, Eichen et al teaches the bridging of electrodes by nucleic acids.

It is also noted that Sato et al and Eichen et al further discloses additional limitations required by instant dependent claims 4-7 as described in detail in this office action in section 12. Therefore the embodiments of claims 4-7 are also obvious for the same reasons given above for instant claim 3. Dependent claims 4-7 are obvious over claims 1-11 of the '977 copending application in view of Sato et al and Eichen et al. Claims 4-7 of the instant application are obvious over claims 2-11 of the '977 copending application in view of Sato et al and Eichen et al.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Remarks from the Applicants

Rejections under 35 U.S.C. § 102(b)

16. Applicant's arguments filed April 3, 2008 have been fully considered but they are not persuasive for the following reasons.

Applicant's argues that "Zenhausern et al merely teaches electrode pairs are situated without being dispersed in a matrix layout" (Remarks, pg. 13, last paragraph). This argument is not persuasive because Zenhausern et al explicitly teaches floating-potential electrodes being dispersed between the counter electrodes in a regular interval (Fig. 3, See the regular spacing of floating potential electrodes #s 501-505, paragraph 0254). Instant specification defines "matrix layout as an interval" (Instant specification USPGPUB, paragraph 0173). Therefore interval teachings of Zenhausern

et al meets the limitation of matrix lay out as claimed and therefore Applicant's arguments are not persuasive.

Rejections under 35 U.S.C. § 103(a)

17. Applicant's arguments with respect to claims 3-21 have been considered but are moot in view of the new grounds of rejection necessitated by claim amendments (Remarks, pgs. 14-16). Since Zenhausern et al, Sato et al and Eichen et al teaches all the structural components of the sensor chip (see this Office Action, section 12), Applicant's arguments regarding are not persuasive. Applicant's arguments regarding teachings of Zenhausern et al in view of Sato et al are addressed below.

Applicants argue that "Zenhausern et al and Sato et al fail to teach at least the adjacent electrodes of the scanning electrodes being bridged by the nucleotide probes" (Remarks, pg. 14, paragraph 4). As described in this office action in section 12, the bridging of the adjacent electrodes are taught by Eichen et al (paragraphs 0044-0045, 0134-0135) and therefore Applicant's argument is moot.

Applicants argue that "Zenhausern et al and Sato et al fail to teach at least the energized scanning electrodes and the second scanning electrodes being bridged by the nucleotide probes" (Remarks, pg. 15, paragraph 1). As described in this office action in section 12, the bridging of the adjacent electrodes are taught by Eichen et al (paragraphs 0044-0045, 0134-0135) and therefore Applicant's argument is moot.

Applicants argue that "Zenhausern et al and Sato et al fail to teach at least the adjacent electrodes of the first scanning electrodes being bridged by the first group of

the nucleotide probes and the adjacent electrodes of the second scanning electrodes being bridged by the second group of nucleotide probes" (Remarks, pg. 15, paragraph 4). As described in this office action in section 12, the bridging of the adjacent electrodes by different groups of probes are taught by Eichen et al (Fig. 2, paragraphs 0044-0045, 0134-0135) and therefore Applicant's argument is moot.

Applicants argue that "Zenhausern et al and Sato et al fail to teach at least the energized and the second scanning electrodes being bridged by the stretched nucleotide probes" (Remarks, pg. 16, paragraph 2). As described in this office action in section 12, Zenhausern et al teaches that voltage is applied to the floating electrode, i.e., scanning electrode (paragraph 0254), which is defined in the instant specification as energizing the scanning electrode (instant specification, paragraph 0014). Stretching of nucleotide probes on the electrodes are taught by Sato et al (Fig. 4c, column 5, lines 44-67, column 6, lines 1-40) and bridging of the adjacent electrodes by probes are taught by Eichen et al (Fig. 2, paragraphs 0044-0045, 0134-0135) and therefore Applicant's argument is moot.

Applicant argues that "Zenhausern et al fails to teach floating potential electrodes dispersed in a matrix layout between the counter electrodes without coupling to a power source" (Remarks, pg. 16, paragraph 3). The argument regarding "matrix layout" is not persuasive because Zenhausern et al explicitly teaches floating-potential electrodes being dispersed between the counter electrodes in a regular interval (Fig. 3, See the regular spacing of floating potential electrodes #s 501-505, paragraph 0254). Instant specification defines "matrix layout as an interval" (Instant specification USPGPUB,

paragraph 0173). Therefore interval teachings of Zenhausern et al meets the limitation of matrix lay out as claimed and therefore Applicant's arguments are not persuasive.

In response to Applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., without coupling to a power source) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Contrary to Applicant's alleged assertion, claims as recited in instant claim 24, does not require a power source and therefore Applicant's arguments are not persuasive.

Double Patenting

18. Applicants have not traversed the above rejections in obviousness-type double patenting. Therefore, provisional obviousness-type double patenting rejection of claims 3-7 over claims 1-12 of copending Application No. 11/222,940 are maintained.

For the reasons as cited above, provisional obviousness-type double patenting rejection of claims 3-7 over claims 1-11 of copending Application No. 11/145,977 are maintained.

Conclusion

19. No claims are allowed.

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Narayan K. Bhat whose telephone number is (571)-272-5540. The examiner can normally be reached on 8.30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram R. Shukla can be reached on (571)-272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Narayan K. Bhat/

Examiner, Art Unit 1634

Narayan K. Bhat, Ph. D.

/BJ Forman/

Primary Examiner, Art Unit 1634